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MINOSAPHAENOPS CROATICUS, A NEW SPECIES OF THE CAVE DWELLING TRECHINAE BEETLE FROM CROATIA, WITH DESCRIPTION OF THE MALE SPECIMEN OF *DEROSSIELLA NONVEILLERI* QUÉINNEC (COLEOPTERA: CARABIDAE: TRECHINAE)

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Lohaj, R. & Jalžić, B.: *Minosaphaenops croaticus*, new species of the cave dwelling Trechinae beetle from Croatia, with description of male specimen of *Derossiella nonveilleri* Quéinnec (Coleoptera: Carabidae: Trechinae). Nat. Croat., Vol. 18, No. 2, 229–242, 2009, Zagreb.

In the paper *Minosaphaenops croaticus* sp. nov. from Glogova jama (Sniježnica mountain range, SE Croatia), the second known species of the genus is described, illustrated and compared with the congeneric species *Minosaphaenops ollivieri* Quéinnec, 2008. The new species is characterised by its wider elytra and head, smaller body size, and the shape of aedeagus. Data on the distribution and the ecology of this remarkable species are also provided. First description of a male of *Derossiella nonveilleri* Quéinnec, 2008, based on the single specimen collected in Drinovčuša jama (Mosor mountain range, central Dalmatia, Croatia) is also provided.

Key words: *Minosaphaenops croaticus* sp. nov., *Derossiella nonveilleri*, taxonomy, troglobiont, Sniježnica, Mosor, Croatia

Lohaj, R. & Jalžić, B.: *Minosaphaenops croaticus*, nova vrsta špiljskog trehina iz Hrvatske, s opisom mužjaka vrste *Derossiella nonveilleri* Quéinnec (Coleoptera: Carabidae: Trechinae). Nat. Croat., Vol. 18, No. 2, 229–242, 2009, Zagreb.

U radu se opisuje *Minosaphaenops croaticus* sp. nov. iz Glogove jame (Sniježnica, jugoistočna Hrvatska), druga poznata vrsta tog roda, uz ilustracije i usporedbu s vrstom istog roda, *Minosaphaenops ollivieri* Quéinnec, 2008. Ovu novu vrstu karakteriziraju šire pokrilje i glava, manje tijelo te oblik edeagusa. Daju se također podaci o rasprostranjenosti i ekologiji ove osobite vrste. Rad donosi i prvi opis mužjaka vrste *Derossiella nonveilleri* Quéinnec, 2008, i to na temelju jedinog primjerka prikupljenog u jami Drinovčuša (Mosor, središnja Dalmacija, Hrvatska).

Ključne riječi: *Minosaphaenops croaticus* sp. nov., *Derossiella nonveilleri*, taksonomija, troglobiont, Sniježnica, Mosor, Hrvatska

INTRODUCTION

Seven genera of aphaenopsoid Trechinae beetles are known from the territory of the Dinarides: *Albanotrechus* Casale & Guéorguiev, 1994 with one species from Central Albania; *Aphaenopsis* G. Müller, 1913 with two species from Central Bosnia – Mts Treskavica and Bjelašnica; *Scotoplanetes* Absolon, 1913 with one species from southern Herzegovina – Vjetrenica pećina cave near Zavala village and Mrcine pećina cave near Grebci village, and from Montenegro – new finding from Vodna jama pit on Dragaljsko polje near Umac (G. Dunay & J. Lakota, pers. comm.), *Dalmataphaenops* Monguzzi, 1993 (*Biokovoaphaenopsis* Jalžić, 1993, junior synonym) with one species from Mt. Biokovo in Croatia; *Adriaphaenops* Noesske, 1928 with seven currently described species from Herzegovina and Montenegro (PRETNER, 1959; PAVIĆEVIĆ, 1990, 2001; QUÉINNEC, 2008; QUÉINNEC & PAVIĆEVIĆ, 2008; QUÉINNEC, PAVIĆEVIĆ & OLLIVIER, 2008), as well as two monotypical recently described genera *Minosaphaenops* Quéinnec, 2008 from Mt. Krivošije, Montenegro and *Derossiella* Quéinnec, 2008 from Mt. Mosor, Croatia (JEANNEL, 1928, 1930; CASALE & LANEYRIE, 1982; DROVENIK & PEKS, 1994; MORAVEC *et al*., 2003; QUÉINNEC, 2008).

Genus *Minosaphaenops* Quéinnec, 2008 with the type species *Minosaphaenops ollivieri* was described based on five specimens collected in three pits located in the Krivošije mountain range in Montenegro. During the biospeleological research of Glogova jama pit near Kuna Konavoska, Sniježnica mountain range, southeastern Croatia, another specimen belonging to this genus was collected by the second author. This new species is described herein.

Genus *Derossiella* Quéinnec, 2008 with the type species *Derossiella nonveilleri* was described based on a single female, collected in April 1999 in a nameless pit ca. 15 m deep and ca. 500 meters SSE from Balićeva špilja (Kraljeva jama), Balić, Mt. Mosor, Croatia. Because of the newly collected male specimen from Drinovčuša jama near Kotlenice, Mt. Mosor in August 2007, we were given the opportunity to provide description of this species' male for the first time. The description is given here below.

MATERIAL AND METHODS

The morphological features of the beetles were examined using the stereoscopic microscope Olympus SZ 60. Macrophotos were taken using the stereoscopic microscope LEICA S8 APO with the digital camera NIKON COOLPIX® E 4500. Male genitalia were dissected, cleaned and mounted in Euparal® on transparent labels under the examined specimens. Drawings of aedeagi were made using the Zeiss transmitted-light microscope and drawing tube.

Abbreviations used in the text are as follows:

TL: total body length (measured from the anterior margin of clypeus to the apex of elytra)

AL: antennal length (measured from the base of antennal scape to the apex of terminal antennal segment)

HW: maximum width of head

HL: head length (measured from the base of the neck to the front margin of the labrum)
PW: maximum width of pronotum
PL: pronotum length (measured along middle linia)
EW: maximum width of elytra
EL: elytral length (measured along sutura from the elytral base to the apex)

Forward slash indicates separate labels.

Codens of museums and private collections:
CNHM – collection of the Croatian Natural History Museum, Zagreb, Croatia
CJL – private collection of Ján Lakota, Ružomberok, Slovakia.

Higher classification of the Trechini used here follows MORAVEC *et al*. (2003) and QUÉINNEC (2008).

RESULTS

Genus *Minosaphaenops* Quéinnec, 2008

Minosaphaenops Quéinnec, 2008: 159, by monotypy; type species: *Minosaphaenops ollivieri* Quéinnec, 2008: 161

Minosaphaenops croaticus n. sp.

(Figs. 1, 4)

Medium-sized trechine with aphaenopsoid characters: elongated head and pronotum with ovoid on the basis strongly narrowed elytra, obviously wider than head and pronotum, body depigmented, strongly flattened (Fig. 1).

Type series: Holotype male labelled as follows: »Croatia, Konavle, Kuna Konavoska, Snježnica, Glogova jama pit, 28.06.2000, lgt. B. Jalžić (white label, printed) / HOLOTYPE *Minosaphaenops croaticus* n. sp. R. Lohaj & B. Jalžić det. 2008 (red label, printed)« CNHM.

Additional specimens examined: Paratype of *Minosaphaenops ollivieri* Quéinnec, 2008 (Fig. 2): female labelled »Montenegro, Orjen Mts., Jasenov Do env., Jasenovska jama (pit), –130 m, 5.6.2004, R. Mlejnek lgt. (white label, printed) / MINOSAPHAENOPS OLLIVIERI Nova gen. Nova sp. PARATYPE 4 Quéinnec, 2007 (red label, printed)«, CJL.

Description.

Total body length 5.1 mm, colour reddish-brown, antennae, head, pronotum and legs darker, mandibles and palpi pale yellow, elytra shiny. Head with a distinct isodiametric microsculpture, microsculpture of pronotum and elytra with isodiametric and transverse meshes. Head and pronotum covered with short and sparse pubescence.

Head elongated, longer than wide, index HL/HW 1.64, widest in the middle, neck well-defined. Frontal furrows incomplete, deep, almost parallel-sided, after

Fig. 1. *Minosaphaenops croaticus* n. sp., holotype, Glogova jama pit.

Fig. 2. *Minosaphaenops ollivieri* Quéinnec, 2008, paratype, Jasenovska jama pit.

Fig. 3. *Derosiella nonveilleri* Quéinnec, 2008, Drinovčuša jama pit. Scale 5 mm.

the level of anterior supraorbital setae divergent and evanescent. Dorsal part of the head covered with short pubescence, anteriorly denser than posteriorly, genae sparsely pubescent. Head with two pairs of supraorbital setae, anterior pair in front of the middle part of head, near furrows, posterior pair at hind part of head near neck, eyes absent. Mandibles long and slender, acutely pointed, right mandible without visible retinaculum. Antennae relatively long and slender, 3.58 mm long, lengths of antennal segments (from scape to terminal segment): 0.25, 0.25, 0.4, 0.33, 0.4, 0.37, 0.35, 0.33, 0.28, 0.3, 0.32 mm.

Pronotum narrow, elongate, subparallel, index PL/PW 1.61, slightly narrower than the head, propleura visible from dorsal view. Anterior angles of pronotum protruding, acute, posterior angles obtuse. Lateral groove deep, with a single pair of anterior setae on basal sixth, posterior pair of setae absent. Pronotum dorsally sparsely pubescent, setae short, suberect, median line inconspicuous.

Elytra subovate elongate, its maximum width at the apical third, index EL/EW 1.64. Basal part strongly narrowed, pedunculate, scutellum small, single pair of basal scutellar setiferous pores present. Elytral striae invisible. Elytral chetotaxy as follows: four macrochetae present in putative stria 3, two microchetae located before macrocheta 1, two microchetae between macrochetae 1–2, interspace between macrochetae 2–3 devoid of microcheta, two microchetae located between macrochetae 3–4, preapical seta short and thin. Six microchetae present in putative stria 2. Abdominal sternites glabrous, pubescence absent, with a single pair of thick and short setae.

Legs relatively short, slender, densely pubescent. First two tarsomeres protarsi distinctly dilated and protracted at their internal margins. Tarsal claws very long and slender, without traces of denticulation on their internal sides.

Aedeagus (Fig. 4) 0.61 mm long, elongate, slender, basal part of medial lobe wider, narrowed towards apex. Apical part regularly narrow, apex obtuse, without a thickened tip. Parameres slender, length of parameres about half of the length of aedeagus, left paramera with one[1] long seta, right paramera with two setae.

Female unknown.

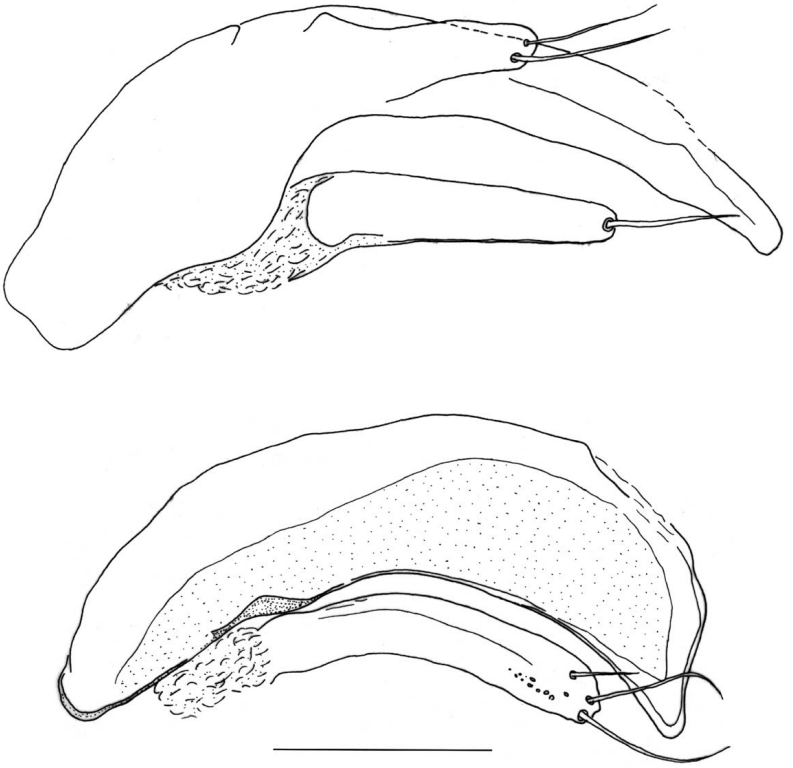
Etymology.

Topotypic, referring to the country of origin, Croatia.

Discussion.

Genus *Minosaphaenops* Quéinnec, 2008 is morphologically similar to the genus *Adriaphaenops* Noesske, 1938, from which it differs by the following combination of characters: (1) elytra more or less glabrous (as opposed to completely pubescent in *Adriaphaenops*), (2) 3rd elytral interval with 4 dorsal setae and one preapical seta (as

[1]Note: Although left paramera of this newly described species bears a single seta and right paramera bears two setae, it is improbable that the missing seta of the left paramera was broken off or lost during the manipulation of the genitalia. The reason we believe this is the fact that there is no second setal pore present on the left paramere. Because only a single specimen is available, it is difficult to determine whether this represents an individual variation or a pattern. Furthermore, all three known males of *Minosaphaenops ollivieri* Quéinnec, 2008 have their parameres with two apical setae, but number of setae of parameres in *Scotoplanetes* Absolon, 1913 and *Dalmataphaenops* Monguzzi, 1993 varies between 4–5; *Aphaenopsis* G. Müller, 1913 presents 5–6 setae, respectively.



Aedeagus, left lateral view:

Fig. 4. *Minosaphaenops croaticus* n. sp.

Fig. 5. *Derosiella nonveilleri* Quéinnec, 2008. Scale 0.2 mm

opposed to 2 dorsal setae and one preapical seta), (3) mentum without a median tooth (as opposed to mentum with simple median tooth). Type species of the genus, *Minosaphaenops ollivieri* was collected in three different pits (depth: 60–280 m) located in the Krivošije mountain range, south-eastern Montenegro: Ericova jama pit (holotype and a single paratype, both male), Maglena jama pit (a single paratype, female) and Jasenovska jama pit (two paratypes, both female). Localities on Mt. Krivošije are ca 25 km distant from Glogova jama pit.

Minosaphaenops croaticus sp. nov. is strikingly similar to the type species of the genus, *Minosaphaenops ollivieri* Quéinnec, 2008. However, these two species can be easily separated using the following key:

1(2) Elytra wider, index EL/EW = 1.66, with maximum width in apical third. Head wider, index HL/HW = 1.64. Apical part of aedeagus regularly narrow, apex obtuse, without thickened tip. Smaller species, 5.1 mm. SE Croatia, Sniježnica mountain range..... *Minosaphaenops croaticus* sp. nov.

2(1) Elytra narrower, index EL/EW = 1.86–1.94, with maximum width in the middle. Head narrower, index HL/HW = 1.8–1.87. Apex of aedeagus with thickened tip. Larger species, 5.50–5.65 mm. Montenegro, Krivošije mountain range..... ..... *Minosaphaenops ollivieri* Quéinnec, 2008

Topographic location and ecology:

Glogova jama pit (UTM: BN81, Figs. 6, 7) is situated on an isolated karstic plateau of Sniježnica, above Konavle polje field, in the south-eastern part of Croatia. Cavernous abyss-shaped entrance is located above village of Kuna Konavoska in a beech forest at the elevation of about 950 m a.s.l. The pit was speleologicaly examined up to 146 m of its depth; there is light up to the depth of ca 100 m. Under the entrance of the vertical shaft and in deeper parts of the pit there are fields and mounds covered with soil alluvium and organic debris. Deepest parts of the pit are formed mainly by fissures, seasonally with numerous water streams. Red-billed chough *(Pyrrhocorax pyrrhocorax* Linné, 1758) nests here and brings plant seeds into the pit. Type specimen was found walking free on a wet drapery in a sideway tunnel at depth of about 115 m (see scheme of the pit).

Temperatures measured on August 20th, 2005:

Air: 3.7 °C
Water: 3.4 °C

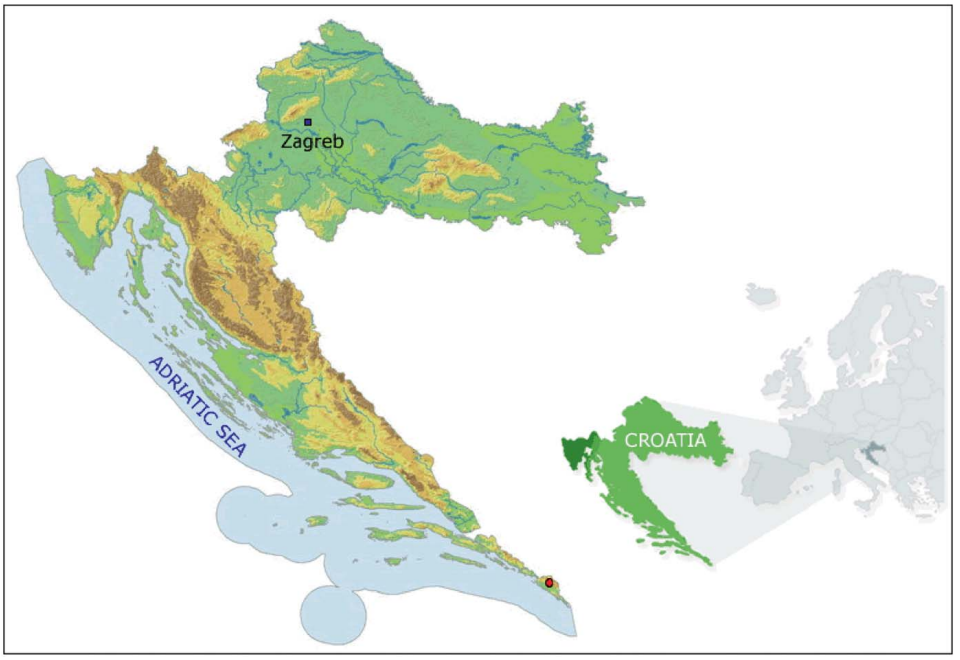


Fig. 6. Map of Croatia, with a red dot marking the position of Glogova jama pit.

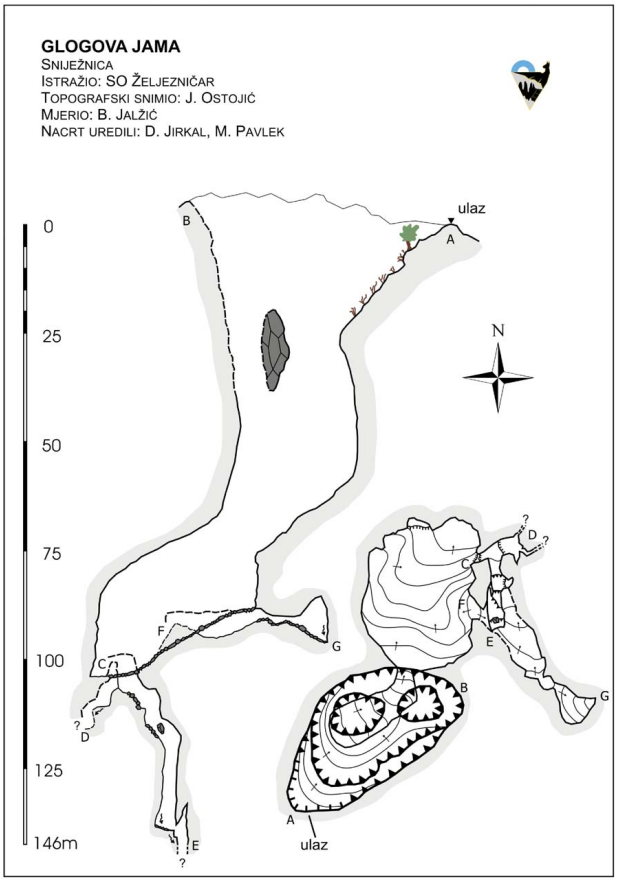


Fig. 7. Topographical scheme of Glogova jama pit.

Because of its position and morphology, Glogova jama is a unique pit refugium with hypogean fauna of Coleoptera, containing species that occur in neighbouring Montenegro and Bosnia & Herzegovina. Four taxa found here represent new genera and species for the fauna of Croatia, two of them – *Minosaphaenops croaticus* sp. nov. and *Blattochaeta marianii kusijanovici* Polak & Jalžić, 2009 ssp. nov. – are even new for science.

Coleopteran fauna found in Glogova jama pit:

Carabidae, Trechinae:

Minosaphaenops croaticus sp. nov.: new genus and species for the fauna of Croatia.

Neotrechus hilfi hilfi (Reitter, 1903): species with five described subspecies occuring in the caves of various mountain ranges of Montenegro (Orjen, Krivošije, Volujak, Lovćen, Durmitor, Vojnik, Troglav) and Bosnia & Herzegovina (Lebršnik, Bjelašnica near Popovo polje, caves near Grab and Ulice). Nominative ssp. was recorded from the caves of Orjen, Krivošije and Lovćen as well as from the caves near Grab and Ulice. New species for the fauna of Croatia.

Neotrechus suturalis otiosus (Obenberger, 1917): species with eight described subspecies occuring in caves in Bosnia & Herzegovina and Montenegro. Subspecies *otiosus* was recorded from the caves on Popovo polje, surrounding Trebinje and Grab (Herzegovina), and from the caves near Močilje, Brgat and Dubrovnik (Croatia) (PRETNER, 1973: 167).

Staphylinidae, Pselaphinae:

Seracamaurops sp.: strictly cavernicolous genus (thirteen species currently described), restricted to the southern Dinaric region, found in caves of Montenegro and Bosnia & Herzegovina. *Seracamaurops grandis* Winkler, 1925 was recorded from Jezero špilja cave on Mt. Sniježnica near Kuna Konavoska (HLAVÁČ *et al*., 2008). One species is also described from the Baribana cave in the western Caucasus (HLAVÁČ *et al*., 1999). Confirmed occurence of this genus for the fauna of Croatia.

Leiodidae, Cholevinae, Leptodirini:

Anthroherpon matulici (Reitter, 1903): species occurring in caves and pits of Orjen, Bijela gora and Krivošije mountains (Montenegro and Bosnia & Herzegovina) (PRETNER, 1969, 1977), newly observed in pits of Rumija mts., Montenegro (MLEJNEK & ZAJÍČEK, 2006, unpublished data). New species for the fauna of Croatia.

Blattochaeta marianii kusijanovici ssp. nov. Polak & Jalžić, 2009: new genus and species for the fauna of Croatia.

Genus *Derossiella* Quéinnec, 2008
(Figs. 3, 5)

Derossiella Quéinnec, 2008: 164, by monotypy; type species: *Derossiella nonveilleri* Quéinnec, 2008: 165.

Material examined: Male labelled: Croatia, Split, Mt. Mosor, Kotlenice, Tukići, Bradarića staje, Drinovčuša jama, 01.08.2007 B. Jalžić lgt. (white label, printed) / *Derossiella nonveilleri* Quéinnec, 2008, R. Lohaj det. 2008 (white label, printed), CNHM.

Description.

The examined specimen fully agrees with the diagnosis of the generic description (QUÉINNEC, 2008: 164). Aphaenopsid habitus with very narrow head and pronotum; elytra oblong-oval, 2.6 times wider than anterior part. Hind angles of pronotum without setae. Surface completely glabrous, striae erased, with two long setiferous pores at the site of putative stria 3 and pair of preapical pores. Head long, parallel-sided, with complete, deep frontal furrows reaching neck constriction. Eyes absent, mentum with simple tooth. Cuticle depigmented, reddish-yellow, body strongly dorso-ventrally flattened, with very long and slender legs and antennae.

Total body length 5.25 mm (measured from anterior margin of clypeus to apex of elytra), holotype female 5.16 mm. Index EL/EW 1.77 (holotype 1.92), index PL/PW 1.5 (holotype 1.45). First and second tarsomeres of protarsi in male distinctly dilated and protracted at their internal margins (female holotype with tarsi not dilated, regularly narrow). Last visible abdominal sternite with a single pair of setae (male), or with two pairs of setae (female).

Aedeagus (Fig. 5) 0.58 mm long, relatively robust, regularly wide, not constricted apically, laterally flattened. Parameres relatively long and slender, longer than half of the length of aedeagus. Apex very short, tip obtuse. Each paramere at apex with three setae, two long and one short.

Discussion.

The shape of the median lobe of aedeagus and three setae on apical parts of parameres are unique feature found only in aphaenopsoid Trechinae of the Dinaric chain. Genera *Adriaphaenops* Noesske 1928 and *Minosaphaenops* have their median lobe slender and curved, apically narrowed, with two setae on each paramere (except for the holotype of *Minosaphaenops croaticus* sp. nov. with one seta on left paramere, see above). Genera *Aphaenopsis* G. Müller, 1913 and *Scotoplanetes* Absolon, 1913 have their median lobe more robust, with long apex and 4-5 apical setae in *Scotoplanetes* and 5–6 in *Aphaenopsis*. Genus *Dalmataphaenops* Monguzzi, 1993 has a very long and slender median lobe with 4–5 apical setae on each paramere. Shape of the median lobe of aedeagus in *Derossiella* Quéinnec is very similar to that of the Anatolian genera *Kosswigia* Jeannel, 1947 and *Sbordoniella* Vigna Taglianti, 1980 of the *Neotrechus* phyletic lineage, which have four setae on parameras.

Notes.

CHRISTIANSEN (1992: 463) presented common morphological troglomorphic characteristics, including specialisation of sensory organs (touch chemoreceptors, hygroreceptors, thermoreceptors, pressure receptors), elongation of appendages and foot modifications, pseudophysogastry, eyes reduction, pigment and wings reduction and increased egg volume. QUÉINNEC (2008: 170) in the chapter concerning the evolutionary trends of cave adapted species, shows that the so-called ´hyper-specialized´ Trechini present wide variability of external morphology in troglobiont genera occuring in the Dinaric chain. The following taxa were included in his study: *Adriaphaenops* Noesske, 1928, *Minosaphaenops* Quéinnec, 2008, *Aphaenopsis* G. Müller, 1913, *Scotoplanetes* Absolon, 1913, *Dalmataphaenops* Monguzzi, 1993, *Derossiella* Quéinnec and the peculiar genus *Croatotrechus* Casale & Jalžić, 1999. The observed peculiarities included: body size, length of appendices (legs, antennae), pubescence of body, number and position of elytral setae, length and shape of frontal furrows and mandibles etc. The author observed that the so-called „troglomorphic characters" of this group are not readily defined, and there are no constant specific morphological features concerning the adaptability to the underground environment. Male genitalia, especially the shape of the median lobe, shape and number of setae on parameres in this group are likewise variable.

Topographic location and ecology:

Drinovčuša jama pit (UTM: HJ32, Figs. 8, 9) is located in the well-developed karst area on the north slopes of Mosor mountain range near Bradarića staje, above Tukići village at the altitude of about 740 m.

Pit is 95 m deep, rift-shaped, fully vertical, with speleothems in the form of draperies situated in its western part. Bottom of the pit is covered by soil deposits, karst rocks and organic debris flooded from outer surface, with numerous seedlings

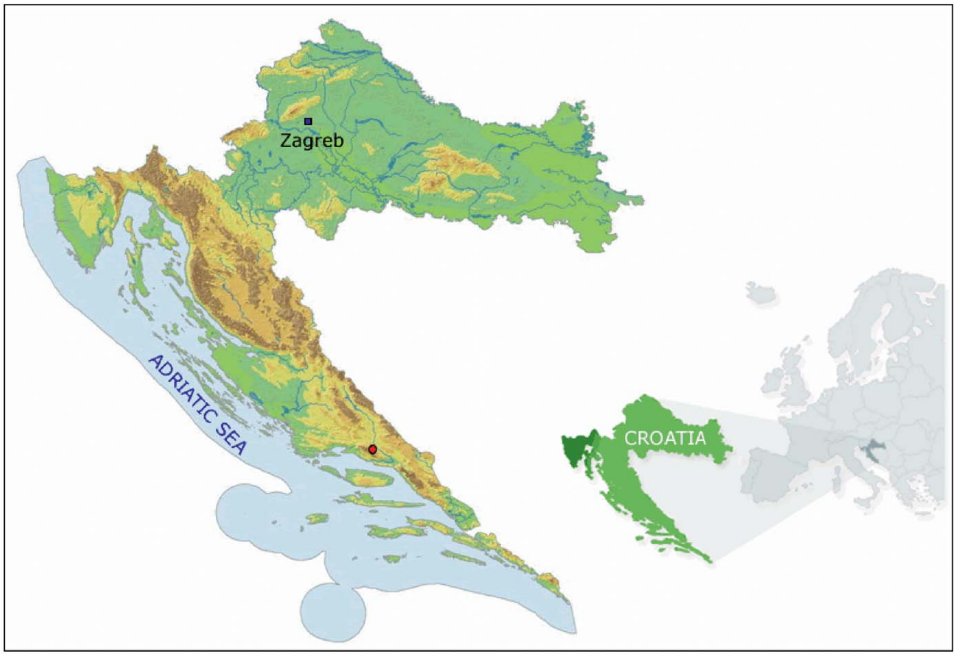


Fig. 8. Map of Croatia with a red dot marking the position of Drinovčuša jama pit.

of hackberries (*Celtis* sp.). Large water streams seasonally occur on the walls in the rain periods, forming water pools on the bottom of pit. Water and air temperature, measured on August 1st, 2007 at the bottom was 7.4°C. Examined specimen was found under a stone on the bottom of a pit.

Associated hypogean fauna found in Drinovčuša jama pit:

Amphipoda:

Niphargus aulicus G. Karaman, 1991 – type locality of the species (BEDEK *et al.*, 2006)

Isopoda:

Alpioniscus sp.

Gastropoda:

Troglaegopis sp.

Pseudoscorpiones:

Neobisium sp., *Roncus* sp.

Arachnida:

Stalita sp.

Turbellaria, Tricladida

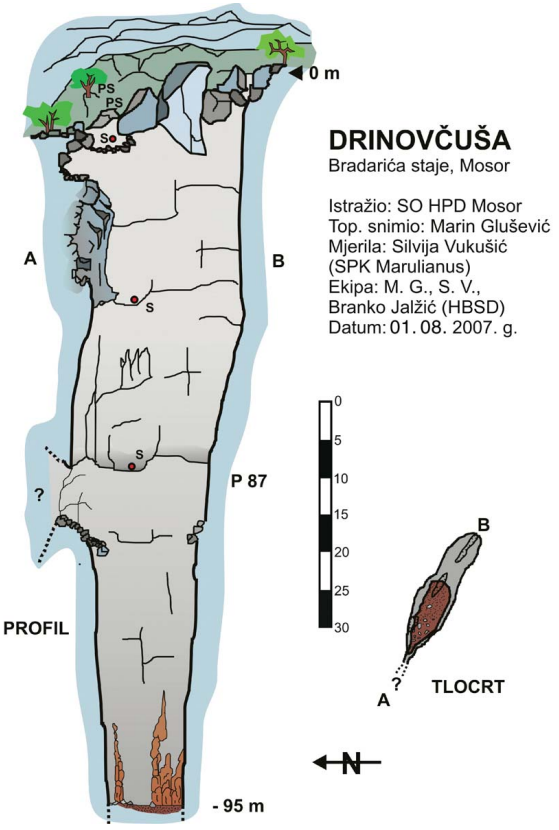


Fig. 9. Topographical scheme of Drinovčuša jama pit.

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